

WHAT IS CLAIMED IS:

1. A solid electrolytic capacitor comprising:
 - a flat solid electrolytic capacitor element having first and second surfaces opposite to each other;
 - an external anode terminal, disposed on the first surface of said flat solid electrolytic capacitor, for electrically connecting to the exterior;
 - an external cathode terminal, disposed on the first surface of said flat solid electrolytic capacitor apart from said external anode terminal, for electrically connecting the exterior;
 - a double-sided thermal adhesive film impregnated with thermosetting resin put on the second surface of said flat solid electrolytic capacitor; and
 - a reinforcement plate fastened on said double-sided thermal adhesive film impregnated with thermosetting resin, said flat solid electrolytic capacitor being sandwiched between said external anode terminal, said external cathode terminal and said double-sided thermal adhesive film impregnated with thermosetting resin, said reinforcement plate,wherein said flat solid electrolytic capacitor has side faces sealed with an eluted material of thermosetting resin impregnated in said double-sided thermal adhesive film impregnated with thermosetting resin.
2. A solid electrolytic capacitor as claimed in claim 1, wherein said reinforcement plate is made of metal.
3. A solid electrolytic capacitor as claimed in claim 1, wherein said flat solid electrolytic capacitor has a capacitance manifestation region, said external cathode terminal has a configuration of a plate which has a size so as to project from the capacitance manifestation region of said flat solid electrolytic capacitor, said double-sided thermal adhesive film impregnated with thermosetting resin having a size so as to project from said flat solid electrolytic capacitor element,

said eluted material fills a space between projected portions of said external cathode terminal and said double-sided thermal adhesive film impregnated with thermosetting resin from said flat solid electrolytic capacitor.

4. A solid electrolytic capacitor as claimed in claim 1, is a surface mounted type, said external anode terminal and said external cathode terminal are disposed with a space left therebetween to electrically connect to the exterior so as to have a surface along a horizontal direction,

said flat solid electrolytic capacitor element comprising:

an anode electrode consisting of a thin plate made of a valve-action metal, said anode electrode having a capacitance manifestation region and an external anode terminal mounting region which are arranged with a space left therebetween;

an oxide film of a base material valve-action metal formed on the capacitance manifestation region of said anode electrode;

a layered cathode electrode adhered to said oxide film to cover said oxide film, said layered cathode electrode including a solid electrolyte layer; and

an insulator disposed on an area between the external anode terminal mounting region of said anode electrode and the capacitance manifestation region of said anode electrode,

said external anode terminal being conductively adhered to the external anode terminal mounting region of said anode electrode,

said external cathode terminal being conductively connected to said cathode electrode at a side of the external anode terminal mounting region in said flat solid electrolytic capacitor element, said external cathode terminal having a size so as to project from said cathode electrode,

said double-sided thermal adhesive film impregnated with thermosetting resin having a size so as to project from said flat solid electrolytic capacitor element; and

said eluted material fills a space between said double-sided thermal adhesive film impregnated with thermosetting resin and a surface of said anode electrode opposite to a surface mounting said external anode terminal.

5. A solid electrolytic capacitor as claimed in claim 4, wherein said eluted material further fills another space between said double-sided thermal adhesive film impregnated with thermosetting resin and a projecting portion of said external cathode terminal from said cathode electrode.

6. A solid electrolytic capacitor as claimed in claim 1, wherein said solid electrolyte layer is made of a conductive macromolecule.

7. A solid electrolytic capacitor as claimed in claim 1, wherein said anode electrode comprises an etched aluminum foil having an enlarged surface by etching.

8. A solid electrolytic capacitor as claimed in claim 1, wherein said double-sided thermal adhesive film impregnated with thermosetting resin has an opening through the front and the back thereof, said opening being filled with a conductor made of a paste material including powder of high conductive metal so as to be in contact with said flat solid electrolytic capacitor element and said reinforcement plate.

9. A solid electrolytic capacitor as claimed in claim 4, wherein said external anode terminal mounting region is divided into first and second external anode terminal mounting sub-regions which put said capacitance manifestation region therebetween, said external anode terminal comprising first and second external anode sub-terminals which are electrically adhered to said first and said second external anode terminal mounting sub-regions, respectively, whereby said solid electrolytic capacitor has a three-terminal transmission path structure.

10. A solid electrolytic capacitor as claimed in claim 4, wherein further comprising an additional double-sided thermal adhesive film

impregnated with thermosetting resin put on said insulator at a side of mounting of said external anode terminal and said external cathode terminal.

11. A solid electrolytic capacitor as claimed in claim 1, wherein said external anode terminal is plate-shaped.

12. A solid electrolytic capacitor as claimed in claim 1, wherein said external cathode terminal is plate-shaped.

13. A solid electrolytic capacitor as claimed in claim 4, wherein further comprises a second double-sided thermal adhesive film impregnated with thermosetting resin put on the first surface of said flat solid electrolytic capacitor, said second double-sided thermal adhesive film impregnated with thermosetting resin having a size so as to project from said flat solid electrolytic capacitor element,

said external cathode terminal being adhered to said second double-sided thermal adhesive film impregnated with thermosetting resin,

said second double-sided thermal adhesive film impregnated with thermosetting resin has an opening through the front and the back thereof, said opening being filled with a conductor made of a paste material including powder of high conductive metal so as to be in contact with the cathode electrode of said flat solid electrolytic capacitor element and said external cathode terminal,

said eluted material fills another space between said double-sided thermal adhesive film impregnated with thermosetting resin and said second double-sided thermal adhesive film impregnated with thermosetting resin.

14. A solid electrolytic capacitor as claimed in claim 4, wherein said double-sided thermal adhesive is formed to be cylindrical so as to enclose said flat solid electrolytic capacitor.

15. A solid electrolytic capacitor as claimed in claim 4, wherein said external cathode terminal is adhered to said cathode electrode.

16. A method of manufacturing a solid electrolytic capacitor, comprising the steps of:

manufacturing a flat solid electrolytic capacitor element;

adhering a double-sided thermal adhesive film impregnated with thermosetting resin to one flat surface of said flat solid electrolytic capacitor element; and

eluting thermosetting resin impregnated in said double-sided thermal adhesive film impregnated with thermosetting resin to seal the side of said flat solid electrolytic capacitor element by an eluted material.

17. A method of manufacturing a solid electrolytic capacitor, comprising the steps of:

manufacturing a flat solid electrolytic capacitor element having first and second surface opposite to each other;

fixing a reinforcement plate on the first surface of said flat solid electrolytic capacitor element, with holding a double-sided thermal adhesive film impregnated with thermosetting resin having a size so as to project from said flat solid electrolytic capacitor element, between said reinforcement plate and said first surface of said flat solid electrolytic capacitor element;

fixedly mounting, on the second surface of said flat solid electrolytic capacitor element, a plate-shaped external cathode terminal having a size so as to project from said flat solid electrolytic capacitor element;

applying heat and pressure to said reinforcement plate and said plate-shaped external cathode terminal to elute thermosetting resin impregnated in said double-sided thermal adhesive film impregnated with thermosetting resin, thereby filling eluted material between projected portions of said double-sided thermal adhesive film impregnated with thermosetting resin and said plate-shaped external cathode terminal from said solid electrolytic capacitor element.

18. A method as claimed in claim 17, wherein said reinforcement plate has a size similar to that of said double-sided thermal adhesive film impregnated with thermosetting resin.

19. A method as claimed in claim 17, wherein said external anode terminal is plate-shaped, said external cathode terminal is plate-shaped, said external anode terminal and said external cathode terminal are disposed on the second surface of said flat solid electrolytic capacitor element with a space left therebetween to electrically connect to the external so as to have a surface along a horizontal direction, the step of manufacturing said flat solid electrolytic capacitor element comprising the steps of:

preparing an anode electrode consisting of a thin plate made of valve-action metal;

forming an oxide film of a base material valve-action metal on a capacitance manifestation region of said anode electrode;

disposing an insulator on a region adjacent to the capacitance manifestation region of said anode electrode;

forming a layered cathode electrode including a solid electrolyte layer on said oxide film so as to adhere to said oxide film to cover said oxide film; and

adhering said external anode terminal to an outside region of said insulator of said anode electrode.